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(71) Applicant *(for all designated States except AE, AG, AU, BB, BH, BN, BW, BZ, CA, CL, CR, CY, DE, DJ, DM, DO, EC, EG, GB, GD, GH, GM, GT, HN, IE, IL, IN, IQ, IR, IT, JM, JO, KE, KH, KN, KR, KW, LA, LC, LK, LS, MA, MD, MT, MU, MW, MY, MZ, NA, NG, NI, NZ, OM, PA, PE, PG, QA, RS, RU, RW, SA, SC, SD, SG, SL, SV, SZ, TH, TN, TR, TT, TZ, UG, US, VC, VN, WS, ZA, ZM, ZW)*: **UNILEVER IP HOLDINGS B.V.** [NL/NL]; Weena 455, 3013 AL Rotterdam (NL).

(71) Applicant *(for all designated States except AL, AO, AT, BA, BE, BF, BG, BJ, BR, CF, CG, CH, CI, CM, CN, CO, CU, CV, CZ, DK, DZ, EE, ES, FI, FR, GA, GE, GN, GQ, GR, GW, HR, HU, ID, IS, JP, KM, KP, LR, LT, LU, LV, LY, MC, ME, MG, MK, ML, MN, MR, MX, NE, NL, NO, PH, PL, PT, RO, SE, SI, SK, SM, SN, ST, SY, TD, TG, UA, US, UZ)*: **UNILEVER GLOBAL IP LIMITED** [GB/GB]; Port Sunlight, Wirral, Merseyside CH62 4ZD (GB).

(71) Applicant *(for US only)*: **CONOPCO, INC., D/B/A UNILEVER** [US/US]; 700 Sylvan Avenue, Englewood Cliffs, New Jersey 07632 (US).

(72) Inventors: **GONG, Zhehui**; Unilever Innovation Centre Wageningen B.V., Bronland 14, 6708 WH Wageningen (NL). **PI, Yingying**; Unilever Innovation Centre Wageningen B.V., Bronland 14, 6708 WH Wageningen (NL).

(74) Agent: **MATHAI, Neenu, Grace**; Unilever Patent Group, Bronland 14, 6708 WH Wageningen (NL).

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(54) Title: CAPRYLOYL GLYCINE FOR USE IN A METHOD OF PREVENTING OR REDUCING HAIR SHEDDING

(57) Abstract: Disclosed are methods and uses for inhibiting protease activity, thereby preventing or reducing hair shedding, comprising applying capryloyl glycine or a composition comprising capryloyl glycine to the scalp of an individual.

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CAPRYLOYL GLYCINE FOR USE IN A METHOD OF PREVENTING OR REDUCING HAIR SHEDDING

Field of the Invention

This invention relates to preventing or reducing hair shedding. In particular, the invention relates to the use of capryloyl glycine, and compositions comprising capryloyl glycine for inhibiting protease activity, thereby preventing or reducing hair shedding.

Background of the Invention

The hair follicle is a regenerating biological system whose primary function is to produce a hair fibre. The hair growth cycle consists of phases of active regeneration (anagen), apoptotic involution (catagen), and relative proliferative quiescence (telogen), which occur continuously throughout the follicle lifetime. Towards the end of catagen and at the beginning of telogen, a completely keratinized hair shaft with a characteristic depigmented and club-like base, termed the “hair club fibre”, is held firmly by a specialized junction complex at the base of the bulge (a group of slow-cycling keratinocytes located below the sebaceous gland).

Lots of reports support the role of proteases e.g., serine proteases in the mechanism of action during hair shedding. In humans, evidence indicates the presence of enzymes in or surrounding the club fibre, for example transglutaminases, and enzyme inhibitors such as plasminogen activator inhibitor type 2 and tissue inhibitor of metalloprotease, serve to retain the club fibre in the follicle. Some investigation showed an upregulation of various serine proteases during exogen and specifically a changing gradient of proteins and/or RNA expression of proteolytic enzymes in the transition of early exogen to late exogen. Whilst shedding is a normal process, higher than normal levels of these enzymes may then lead to excessive or early shedding resulting in a reduction in hair density.

There is a continuing need for cosmetically acceptable treatments which are capable of preventing or reducing hair shedding through targeting of processes involved in exogen. The present inventors have found that treating the scalp with capryloyl glycine can inhibit the protease activity thereby prevent or reduce hair shedding, even in the absence of conventional anti-hair fall agents.

Summary of the Invention

In a first aspect, the present invention provides use of capryloyl glycine or a composition comprising capryloyl glycine for inhibiting protease activity, thereby preventing or reducing hair shedding.

The invention may also be described in one or more of the following aspects:

- Capryloyl glycine or a composition comprising capryloyl glycine for use as a medicament for inhibiting protease activity, thereby preventing or reducing hair shedding.

- Use of capryloyl glycine or a composition comprising capryloyl glycine for inhibiting protease activity, thereby preventing or reducing hair shedding.

- Use of capryloyl glycine or a composition comprising capryloyl glycine for inhibiting protease activity.

- Capryloyl glycine or a composition comprising capryloyl glycine for use in preventing or reducing hair shedding.

- Capryloyl glycine or a composition comprising capryloyl glycine for use in inhibiting protease activity; whererin said composition provides a greater benefit of inhibiting protease activity in comparison to a composition that does not contain capryloyl glycine.

- Capryloyl glycine or a composition comprising capryloyl glycine for use in preventing or reducing hair shedding; whererin said composition provides a greater benefit of preventing or reducing hair shedding in comparison to a composition that does not contain capryloyl glycine.

- Use of capryloyl glycine or a composition comprising capryloyl glycine in the manufacture of a medicament in inhibiting protease activity, thereby preventing or reducing hair shedding.

- A method for preventing or reducing hair shedding, the method comprising applying capryloyl glycine or a composition comprising capryloyl glycine to the scalp of an individual, in an amount effective to inhibit protease activity involved in hair shedding of the individual.

The present invention also provides capryloyl glycine or a composition comprising capryloyl glycine for use in inhibiting protease activity involved in hair shedding, thereby preventing or reducing shedding of hair club fibres from hair follicles, thereby preventing or reducing hair fall.

All other aspects of the present invention will more readily become apparent upon considering the detailed description and examples which follow.

Detailed Description of the Invention

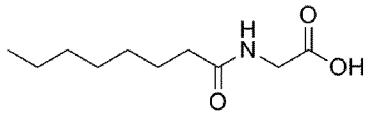
For the avoidance of doubt, any feature of one aspect of the present invention may be utilized in any other aspect of the invention. The word "comprising" is intended to mean "including" but not necessarily "consisting of or "composed of." In other words, the listed steps or options need not be exhaustive. It is noted that the examples given in the description below are intended to clarify the invention and are not intended to limit the invention to those examples per se. Similarly, all percentages are weight/weight percentages unless otherwise indicated. Except in the operating and comparative examples, or where otherwise explicitly indicated, all numbers in this description and claims indicating amounts of material or conditions of reaction, physical properties of materials and/or use are to be understood as modified by the word "about". Numerical ranges expressed in the format "from x to y" are understood to include x and y. When for a specific feature multiple preferred ranges are described in the format "from x to y", it is understood that all ranges combining the different endpoints are also contemplated. As used herein, the indefinite article “a” or “an” and its corresponding definite article “the” means at least one, or one or more, unless specified otherwise. The various features of the present invention referred to in individual sections above apply, as appropriate, to other sections *mutatis mutandis*. Consequently, features specified in one section may be combined with features specified in other sections as appropriate. Any section headings are added for convenience only and are not intended to limit the disclosure in any way.

“Hair care composition”, as used herein, is meant to include a composition for topical application to hair and/or scalp of mammals, especially humans. Such a composition may be generally classified as leave-on or rinse off, and includes any product applied to a human body

for also improving appearance, cleansing, odor control or general aesthetics. The composition of the present invention can be in the form of a liquid, lotion, cream, foam, scrub, gel, or bar. Non-limiting examples of such compositions include leave-on hair lotions, creams, and rinse-off shampoos, conditioners, shower gels, or toilet bar.

"Hair fall", as used herein, is meant to include the hair shedding from the hair follicle.

Capryloyl glycine for use in present invention is also known as N-(1-oxooctyl) glycine (C10H19NO3). The CAS number is 14246-53-8 and the compound has the general formula (I) as below:



(I)

The capryloyl glycine may be used in substantially pure form or as part of a composition.

The process leading to the final step of hair shedding is reported to be driven by proteolytic activity and contributes to the detachment of club hair. During late telogen and exogen, increased protease activity may lead to excessive and unwanted hair loss. Materials that can correct proteolytic activity could be beneficial in reducing excessive hair loss. Serine proteases have been shown to play a role in the exogen phase of the hair growth cycle.

Capryloyl glycine has now been found to inhibit the protease activity, which is believed to be involved in hair shedding. Thus, the composition comprising capryloyl glycine provides a greater benefit of inhibiting protease activity in comparison to a composition that does not contain capryloyl glycine. And the composition comprising capryloyl glycine provides a greater benefit of i preventing or reducing hair shedding in comparison to a composition that does not contain capryloyl glycine. Thus, according to a preferred aspect, the present invention provides for capryloyl glycine or a composition comprising capryloyl glycine for inhibiting protease activity, thereby preventing or reducing hair shedding, thereby preventing or reducing hair fall, preferably for providing greater benefit above in comparison to a composition does not contain capryloyl glycine. The shedding of hair is preferably the shedding of the club fibres from hair follicles. Such inhibition is preferably non-therapeutic, more preferably cosmetic.

The capryloyl glycine may be used in substantially pure form. However, in a preferred embodiment the capryloyl glycine is preferably used in the invention in the form of a personal care composition which is suitable for topical application to the hair and scalp.

Suitable personal care compositions for use in the invention include rinse-off or leave-on hair and scalp care compositions such as shampoos, conditioners, creams, lotions, gels, serums, mousses or oils. Leave-on hair and scalp care compositions are preferred. Alternatively, rinse-off hair and scalp care compositions such as shampoos and conditioners are preferred.

The capryloyl glycine will generally be included in a composition for use in the invention at a level of from 0.01 to 10%, preferably from 0.05 to 5%, more preferably from 0.1 to 2%, furthermore preferably from 0.1 to 1% by weight of the composition.

Other actives suitable for use in the present invention include zinc salt, preferably soluble zinc salt, or piroctone compound preferably piroctone olamine. The soluble zinc salt for use in the present invention preferably comprises one or more of zinc acetate, zinc gluconate, zinc ammonium sulfate, zinc bromide, zinc chloride, zinc fluoride, zinc formate, zinc glycerophosphate, zinc iodide, zinc lactate, zinc nitrate, zinc salicylate, zinc sulfate.

Compositions for use in the invention will generally include a cosmetically acceptable vehicle. The term “cosmetically acceptable” means that the vehicle is suitable for topical application to the skin, has good aesthetic properties, is compatible with the at least one biotin binding compound and the at least one precursor for biotin biosynthesis selected from pimelic acid and/or salts thereof and any other ingredients, and will not cause any safety or toxicity concerns.

The vehicle may comprise an aqueous phase, an oil phase, an alcohol, a silicone phase or a mixture thereof, and may be in the form of an emulsion. Emulsions can have a range of consistencies including thin lotions (which may also be suitable for spray or aerosol delivery), creamy lotions, light creams and heavy creams.

Compositions for use in the invention may also be formulated in a single-phase carrier such as a hydrophobic or hydrophilic liquid. Suitable hydrophobic liquid carriers include liquid polyorganosiloxanes, mineral oils, hydrogenated polyisobutene, polydecene, paraffins and isoparaffins of at least 10 carbon atoms, aliphatic or aromatic ester oils (such as isopropyl

myristate, lauryl myristate, isopropyl palmitate, diisopropyl sebacate, diisopropyl adipate and C12 to C15 alkyl benzoates), polyglycol ethers (such as polyglycol butanol ethers) and mixtures thereof. Suitable hydrophilic liquid carriers include water, monohydric or polyhydric aliphatic alcohols having 2 to 8, preferably 2 or 3 carbon atoms (such as ethanol and isopropanol, oligoglycol ethers having 2 to 5 repeat units (such as dipropylene glycol) and mixtures thereof.

Liquid form compositions for use in the invention may be thickened, for example using one or more water soluble or colloidally water-soluble polymeric thickening agents. Suitable water soluble or colloidally water-soluble polymeric thickening agents include hydroxyethyl cellulose, methyl cellulose, hydroxypropyl methyl cellulose, polyquaternium-10, carrageenan, guar gum, hydroxypropyl guar gum, xanthan gum, polyvinylalcohol, acrylic acid/ethyl acrylate copolymers, carboxyvinyl polymers, cross-linked polyacrylate polymers and polyacrylamide polymers.

Preferred types of composition for use in the invention include shampoos, oils and lotions, which are intended for topical application to the hair and scalp.

Shampoo compositions for use in the invention are generally aqueous (i.e. they have water or an aqueous solution as their major component), and will suitably comprise from 50 to 98%, preferably from 60 to 90% water (by weight based on the total weight of the composition).

Shampoo compositions for use in the invention will typically comprise one or anionic surfactants such as sodium oleyl succinate, ammonium lauryl sulfosuccinate, ammonium lauryl sulphate, sodium dodecylbenzene sulphonate, triethanolamine dodecylbenzene sulfonate, sodium cocoyl isethionate, sodium lauryl isethionate, sodium N-lauryl sarcosinate, sodium lauryl sulfate, sodium lauryl ether sulfate (n) EO, (where n ranges from 1 to 3), ammonium lauryl sulfate and ammonium lauryl ether sulfate (n) EO, (where n ranges from 1 to 3) .

Mixtures of any of the above-described materials may also be used.

The total amount of anionic surfactant in shampoo compositions for use in the invention generally ranges from 5 to 30%, preferably from 8 to 20% (by weight based on the total weight of the composition).

Shampoo compositions for use in the invention may also include co-surfactants such as nonionic surfactants, which can be included in an amount ranging from 0.5 to 8%, preferably

from 2 to 5% (by weight based on the total weight of the composition) and/or amphoteric or zwitterionic surfactants, which can be included in an amount ranging from 0.5 to 8%, preferably from 1 to 4% (by weight based on the total weight of the composition). Representative nonionic surfactants include alkanolamides such as cocamide monoethanolamide and cocamide monoisopropanolamide; alkyl polyglucosides such as cocoglucoside and lauryl glucoside; and acyl glucamides such as cocoyl methyl glucamide.

Mixtures of any of the above-described materials may also be used.

Shampoo compositions for use in the invention may also include one or more cationic polymers, which can be included in an amount ranging from 0.01 to 5%, preferably from 0.05 to 2% (by weight based on the total weight of the composition). Representative cationic polymers include cationic polysaccharide polymers such as cationic cellulose derivatives and cationic guar gum derivatives such as guar hydroxypropyltrimethylammonium chloride.

Shampoo compositions for use in the invention may also include one or more suspending agents, which can be included in an amount ranging from 0.05 to 5%, preferably from 0.1 to 3% (by weight based on the total weight of the composition). Representative suspending agents include polyacrylic acids, cross-linked polymers of acrylic acid, copolymers of acrylic acid with a hydrophobic monomer, copolymers of carboxylic acid-containing monomers and acrylic esters, cross-linked copolymers of acrylic acid and acrylate esters, heteropolysaccharide gums and crystalline long chain acyl derivatives such as ethylene glycol distearate.

Hair oils and lotions for use in the invention typically have an oil phase containing at one or more cosmetically acceptable fatty materials which may be liquid or solid at room temperature (25°C). Lotions are typically aqueous emulsions having an aqueous phase in addition to the oil phase.

Suitable cosmetically acceptable fatty materials include naturally derived oils (such as sunflower oil, borage oil, soybean oil, castor oil, olive oil and almond oil); esters of monoalcohols or of polyols with monocarboxylic or polycarboxylic acids, at least one of the alcohols and/or acids comprising at least one hydrocarbon-based chain containing at least 6 carbon atoms (such as octyl palmitate, isopropyl myristate, isopropyl palmitate, isopropyl isostearate, hexyl laurate, isohexyl laurate, isohexyl palmitate, decyl oleate, isodecyl oleate, hexadecyl stearate, decyl stearate, dihexyldecyl adipate, lauryl lactate, myristyl lactate, cetyl lactate, oleyl stearate, oleyl

oleate, oleyl myristate, lauryl acetate, cetyl propionate, isononyl isononanoate, propylene glycol dicaprate, diisopropyl adipate, dibutyl adipate, and oleyl adipate); ethers (such as dicapryl ether); fatty alcohols (such as cetyl alcohol, stearyl alcohol and behenyl alcohol); isoparaffins (such as isooctane, isododecane and isohexadecane); silicone oils (such as cyclomethicone, dimethicone and dimethiconol); hydrocarbon oils (such as mineral oil, petrolatum and polyisobutene); fatty acids containing from 8 to 30 carbon atoms, (such as stearic acid, lauric acid, palmitic acid and oleic acid); vegetable fats (such as cocoa butter, coconut oil, palm oil and shea butter); petroleum-based, natural and synthetic waxes (such as lanolin wax, beeswax, carnauba wax, candelilla wax, paraffin wax, lignite wax, microcrystalline waxes, ceresin, ozokerite, and polyethylene waxes); hydrogenated oils which are solid at 25° C (such as hydrogenated castor oil, hydrogenated jojoba oil, hydrogenated palm oil, hydrogenated tallow and hydrogenated coconut oil);and fatty esters that are solid at 25°C (such as C_{20-40} alkyl stearate).

The aqueous phase of lotions for use in the invention may also include one or more organic liquids that are miscible with water at room temperature (25°C). Exemplary water-miscible organic liquids include monohydric and polyhydric alcohols and derivatives thereof such as C_2-C_6 alkanols (such as ethanol and isopropanol); C_2-C_{10} glycols and polyols (such as glycerol, propylene glycol, butylene glycol, pentylene glycol, hexylene glycol, caprylyl glycol, dipropylene glycol, and diethylene glycol); C_3-C_{16} glycol ethers (such as mono-, di-, or tripropylene glycol (C_1-C_4) alkyl ethers and mono-, di-, or triethylene glycol (C_1-C_4) alkyl ethers) and polyethylene glycol having 2 to 12 oxyethylene units.

Lotions for use in the invention may also include surface active ingredients, such as emulsifiers and solubilizers, to enable two or more immiscible components to be combined homogeneously and to help stabilize the composition. Emulsifiers that may be used to form O/W or W/O emulsions include sorbitan oleate, sorbitan sesquioleate, sorbitan isostearate, sorbitan trioleate, PEG-20 sorbitan isostearate, polyglyceryl-3-diisostearate, polyglycerol esters of oleic/isostearic acid, polyglyceryl-6 hexaricinolate, polyglyceryl-4-oleate, polyglyceryl-4 oleate/PEG-8 propylene glycol cocoate, polyglyceryl-2 dipolyhydroxystearate, PEG-30 dipolyhydroxystearate, oleamide DEA, TEA myristate, TEA stearate, magnesium stearate, sodium stearate, potassium laurate, potassium ricinoleate, sodium cocoate, sodium tallowate, potassium castorate, sodium oleate, cetyl phosphate, diethanolamine cetyl phosphate, potassium cetyl phosphate, sodium glyceryl oleate phosphate, dimethicone copolyol, cetyl dimethicone copolyol, octyldimethicone ethoxyglucoside copolyol, dimethicone copolyol crosspolymer and laurylmethicone copolyol.

Combinations of any of the above described materials or product forms may also be used.

Compositions for use in the invention (as described above) may include additional actives for improving the physical and/or aesthetic characteristics of the scalp and/or the hair. Examples include amino acids, vitamins, minerals and/or antioxidants, emollients, humectants, sunscreens, anti-irritants, exfoliating agents, botanical extracts (such as pomegranate, white birch, green tea, chamomile and licorice extracts) and mixtures thereof.

Compositions for use in the invention (as described above) may include additional functional ingredients for improving the physical and/or aesthetic characteristics of the composition *per se.* Examples include inorganic pigments (such as titanium oxide, zirconium oxide, cerium oxide, zinc oxide, iron oxide, chromium oxide, manganese violet, ultramarine blue, chromium hydrate and ferric blue); organic pigments (such as carbon black and the organic lakes of barium, strontium, calcium or aluminium); pearlescent agents (such as mica coated with titanium oxide and/or iron oxide); dyes, preservatives (such as disodium EDTA, benzyl alcohol, methylparaben, phenoxyethanol, propylparaben, ethylparaben, butylparaben and isobutylparaben); pH adjusters and fragrances (such as essential oils, flower oils, natural extracts from resins, gums, balsams, beans, mosses and other plants, as well as synthetic aromatic materials).

Mixtures of any of the above described materials may also be used.

Method

The present invention provides for a method for preventing or reducing hair shedding, the method comprising applying capryloyl glycine or a composition comprising capryloyl glycine to the scalp of an individual, in an amount effective to inhibit protease activity involved in hair shedding of the individual. The method is non-therapeutic in nature. Preferably it is for cosmetic purpose.

The composition is suitably applied to the hair and scalp and massaged into the surface of the scalp. Generally, an amount corresponding to about 1 to 15 ml of the composition per application is applied uniformly over the area of treatment daily or at least once a week over a time interval of at least 7 (seven) days, preferably at least 28 days, more preferably at least 30 (thirty) days.

The present invention also provides capryloyl glycine or a composition comprising capryloyl glycine for use in preventing or reducing hair shedding, preferably the composition provides a greater benefit of preventing or reducing hair fall in comparison to a composition that does not contain capryloyl glycine. The present invention also provides capryloyl glycine or a composition comprising capryloyl glycine for use in inhibiting protease activity involved in hair shedding, thereby preventing or reducing shedding of hair club fibres from hair follicles, thereby preventing or reducing hair fall, preferably, the composition provides a greater benefit above in comparison to a composition that does not contain capryloyl glycine.

The invention will be further illustrated by the following, non-limiting Examples.

Examples

Example 1

This example demonstrates the protease inhibition activity by capryloyl glycine in vitro.

The test (Sample 1 and 2) and control (Placebo) solutions were formulated with the compositions given in Table 1.

TABLE 1

Ingredient %w/w	Placebo	Sample 1	Sample 2
Capryloyl glycine	-	0.1	1.0
Sodium laureth sulfate	5.0	5.0	5.0
Water	To 100	To 100	To 100

Test method

Protease inhibition was determined using the EnzChek™ Protease Assay kit direct fluorescence-based assay for detecting metallo-, serine, acid, and sulfhydryl proteases. The assay contains casein derivatives labelled with a pH-insensitive green, fluorescent BODIPY® FL peptides that have an excitation and emission maxima of approximately 505/513 nm and 589/617 nm, respectively. Standard fluorescein filters to detect BODIPY FL dye–labelled peptides were used as per manufacturer's instructions.

Reaction mixtures containing trypsin (1.0 µg/mL), BODIPY® casein substrate (final concentration 5 µg/mL) and Tris-HCl, pH 7.8, 10 mmol/L, were set up in 96-well plates, covered in foil and incubated at 37°C. Placebo or samples above was added to the reaction mixture. After incubation for one hour, the fluorescence was measured at excitation/emission wavelengths 485/530 nm. An increase in fluorescence was proportional to protease activity.

The presence of protease activity in human hair bulbs has been shown previously using an enzyme based in vitro assay. The assay allows the use of trypsin as control serine protease enzyme where increasing fluorescence units are proportional to increasing protease activity. Conversely a decrease in fluorescence activity can be detected when a protease inhibitor is added to the reaction mix. The experiments were carried out to examine whether samples comprising capryloyl glycine with different concentrations could attenuate trypsin activity.

The result is summarized in Table 2.

TABLE 2

Samples	Placebo	Sample 1	Sample 2
Fluorescence units (mean)	38319.6	26607.4	22150.6

The result above Sample 1 and 2 delivered a significantly ($P<0.05$) better (lower) trypsin activity than placebo sample. This illustrates the samples containing capryloyl glycine can inhibit protease activity, thereby preventing hair shedding of hair club fibres from hair follicles. And it showed an increase in such inhibition activity with increasing concentration.

CLAIMS

1. Use of capryloyl glycine or a composition comprising capryloyl glycine for inhibiting protease activity, thereby preventing or reducing hair shedding.

2. Use of capryloyl glycine or a composition comprising capryloyl glycine for inhibiting protease activity.

3. Use as claimed in claim 1 or 2 wherein said use is non-therapeutic in nature.

4. Capryloyl glycine or a composition comprising capryloyl glycine for use in inhibiting protease activity, thereby preventing or reducing hair shedding.

5. Capryloyl glycine or a composition comprising capryloyl glycine for use in inhibiting protease activity.

6. Capryloyl glycine or a composition comprising capryloyl glycine for use in inhibiting protease activity; whererin said composition provides a greater benefit of inhibiting protease activity in comparison to a composition that does not contain capryloyl glycine.

7. Capryloyl glycine or a composition comprising capryloyl glycine for use in preventing or reducing hair shedding; whererin said composition provides a greater benefit of preventing or reducing hair shedding in comparison to a composition that does not contain capryloyl glycine.

8. Use of capryloyl glycine or a composition comprising capryloyl glycine in the manufacture of a medicament in inhibiting protease activity, thereby preventing or reducing hair shedding.

9. A method for preventing or reducing hair shedding, the method comprising applying capryloyl glycine or a composition comprising capryloyl glycine to the scalp of an individual, in an amount effective to inhibit protease activity involved in hair shedding of the individual.

10. Method as claimed in claim 9 wherein said method is non-therapeutic in nature.

11. Use,method, compound or composition as claimed in any of claims 1 to 10, wherein the composition comprising capryloyl glycine additionally comprises a zinc salt, preferably soluble zinc salt.

12. Use , method, compound or composition as claimed in any of claims 1 to 11, wherein the composition comprising capryloyl glycine additionally comprises a piroctone compound, preferably piroctone olamine.

13. Use, method, compound or composition as claimed in any of claims 1 to 12, wherein the composition comprising capryloyl glycine at a level from 0.01 to 10%, preferably from 0.05 to 5%, more preferably from 0.1 to 2% by weight of the composition.

14. Use, method, compound or composition as claimed in any of claims 1 to 13, wherein the composition comprising capryloyl glycine is a leave-on composition.

15. Use, method, compound or composition as claimed in any of claims 1 to 14, wherein the composition comprising capryloyl glycine is a rinse-off composition, preferably a shampoo.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/063032

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K8/27 A61K8/44 A61K8/49 A61K31/198 A61P17/14
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61K A61P A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, BIOSIS, EMBASE, FSTA, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE GNPD [Online] MINTEL; 2 November 2022 (2022-11-02), anonymous: "Men Anti Hair-Loss Treatment for Men", XP093115921, Database accession no. 10332260	1,3,4, 7-10,14
Y	the whole document ----- DATABASE GNPD [Online] MINTEL; 23 August 2021 (2021-08-23), anonymous: "Anti-Hair Loss Professional Vials", XP093115926, Database accession no. 8907379	1-15 1,3,4, 7-10,14
Y	the whole document ----- -/--	1-15

[x] Further documents are listed in the continuation of Box C. [x] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
23 July 2024	19/08/2024

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE GNPD [Online] MINTEL; 6 April 2010 (2010-04-06), anonymous: "Anti-Loss & Density Bi-Phasic Spray", XP093115930, Database accession no. 1324523	1,3,4, 7-10,14
Y	the whole document	1-15

X	CN 111 110 600 A (QUANHOO (SHENZHEN) INVEST DEVELOPMENT CO LTD) 8 May 2020 (2020-05-08)	1,3,4, 7-11
Y	claim 1 Test Example 4	1-15

X	CN 113 350 213 A (ZHAO NIANDONG) 7 September 2021 (2021-09-07)	1,3,4, 7-11,15
Y	claim 1	1-15

X	CN 115 554 213 A (GUANGZHOU MEISI BIOTECHNOLOGY CO LTD) 3 January 2023 (2023-01-03)	1,3,4, 7-11,15
Y	claims 1,2	1-15

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2024/063032

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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CN 113350213 A	07-09-2021	NONE	
CN 115554213 A	03-01-2023	NONE	